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PILOTS NEEDED NCOs WELCOME:

How Enlisted RPA Pilots Can Ensure Air Superiority in the 21st Century

by

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At the end of any journey, a traveler pauses and reflects upon lessons learned and milestones reached. Whether it was a solitary journey or one made in a group, it is never truly made alone. With this in mind, I would like to thank multiple people in general and a few specifically. First, I would express my deep gratitude for Dr. Heather Marshall and Dr. Chris Johnson, who took on the task of guiding me through the process of converting me from a low-level writer to one who could produce a paper, which may impact the Air Force going forward.

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ABSTRACT

The United Sates Air Force is entering into a new, dynamic, age where technology and air power operations are pushing boundaries. The Air Superiority 2030 Flight Plan, which was published this past May, highlights that the current Air Force structure and manpower may not be able to meet and defeat future adversaries, and calls for new approaches to ensure that air superiority is maintained. One aspect of this changing world is that it requires a new approach to staffing the pilots for Remote Pilot Aircraft (RPA. Recently, the Air Force announced that enlisted pilots would be allowed to fly the RQ-4 Global Hawk, one of the three primary RPA in its operational inventory.

The Air Force is experiencing a pilot shortage for RPA, which is affecting combat operations, leaving the Air Force to question how future RPA missions will influence air superiority goals. A problem/solution research framework will be used to review steps taken by the service to alleviate the manning crisis and possible solutions to try going forward. It will include a review of RPA training, staffing, and retention issues. This paper will determine if the Air Force could have enough pilots to meet the future demands of air superiority if it allows enlisted personnel to fly every RPA platform in the USAF inventory.

INTRODUCTION

General Billy Mitchell demonstrated an aircraft could sink a ship on July 21, 1921. The *Ostrfriesland,* a captured World War I battleship, was destroyed by a flight of seven bi-plane bombers, each carrying a 2,000-pound bomb. In 22 minutes and only six bombing runs the aviators had accomplished what 18 direct hits from British battleships and a subsequent mine blast during the naval battle of Jutland could not, sending the battleship to the bottom.[1] This event signaled the twilight of the battleship era warfare and gave rise to the aircraft carrier as the key component of US naval power. Eighty years later, on February 21, 2001, an unmanned aircraft near Nellis Air Force Base identified its target and launched a 'live' Hellfire-C laser-guided missile, hitting an unmanned tank.[2] This event successfully concluded a three-part test to determine if a Remote Piloted Aircraft (RPA) could transition from an Intelligence, Surveillance, and Reconnaissance (ISR) platform to a multi-role weapons system capable of delivering precession strikes on an enemy target.[3] Though not as high profiled as the sinking of the *Ostrfriesland,* the Nellis test has had a similar impact upon unmanned flight operations. It has changed the way in which air supremacy is gained and maintained in current and future operations.

While Air Force leaders recognized what armed drones could provide to military operations they did not foresee the level to which RPA operations increased following the arming of Remote Piloted Aircraft. The RPA flying hours show an ever-increasing demand. It took the Air Force sixteen years to reach one million flying hours in the RPA community in 2011. However, just over two years later, cumulative RPA operations reached two million flying hours.[4]

Due to this lack of foresight, the RPA pilot community is understaffed and overworked. RPA pilots log an average of 900 flying hours a year as opposed to fighter pilots flying 250 hours a year.[5] The number of flying hours for individual RPA pilots, and the community as a whole, points toward a community pushed to the breaking point. The Air Force has little control over the number of RPA Combat Air Patrols requested by combatant commanders. What the Air Force does have control over is the staffing of RPA pilots. If the Air Force does not answer the RPA manning question correctly, America's ability to maintain the Air Force missions of Air Superiority and Intelligence, Surveillance, and Reconnaissance will be in jeopardy.

The Air Force RPA community, through three primary airframes, is currently providing air superiority missions around the globe. These three airframes are the MQ-1 Predator (Fig.1), MQ-9 Reaper (Fig. 2), and the RQ-4 Global Hawk (Fig. 3). The Predator is a multi-role RPA capable of conducting both ISR and precision strike missions from medium or low altitude.[6] The Reaper provides the same mission capabilities as the Predator but it is larger and more powerful than the Predator.[7] The Global Hawk is a high-altitude long endurance ISR platform that does not have strike capabilities.[8]

Fig. 1. A Predator RPA returning from an Operation Iraqi Freedom Mission. (Reprinted from Air Force Fact Sheet, *MQ-1B Predator*, US Air Force, September 23, 2015) Photo courtesy of 1st Lt. Shannon Collins.

Fig. 2. A MQ-9 Reaper is capable of carrying more ordinance than a Predator. (Reprinted from Air Force Fact Sheet, *MQ-9 Reaper*, U.S. Air Force, 23 September 2015) Courtesy Photo

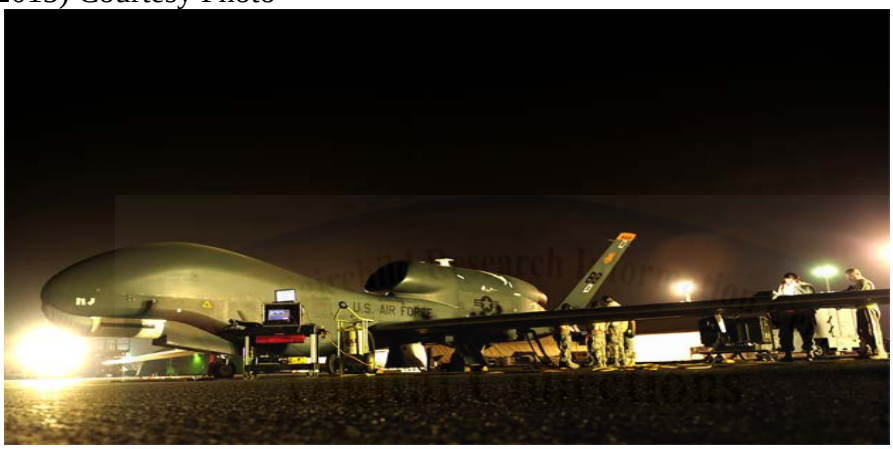

Fig. 3. A MQ-4 Global Hawk forward deployed preparing for mission. (Reprinted from Air Force Fact Sheet, *MQ-4 Global Hawk*, US Air Force, 27 October 2014) Photo courtesy of Staff Sgt. Andy M. Kin.

The Global Hawk is launched and recovered by a dedicated Launched and Recovered Element (LRE) that requires only the pilot during this phase of a mission. As the aircraft transitions into the Mission Control Element (MCE) phase of flight, a sensor operator joins the team. Due to the long duration of most missions, the Global Hawk is in the MCE configuration for a majority of the flight.[9] The Predator and Reaper conducted LRE and MCE operations with both a pilot and sensor operator and for this reason all discussion in this paper will reflect the two-person crew concept.

The two-member crew comprised of a commissioned pilot and an enlisted sensor operator conduct Air Force RPA operations (Fig. 4). Regardless of LRE or MCE status of RPAs and if there is a one or two person crew involved, the one constant throughout the mission is the pilot and therefore it is pilot staffing which is the most critical aspect.

Fig.4. RPA crew conducting a mission, (sensor operator in foreground and pilot in background). (Reprinted from Jonathan Wright, "Fighter vs. RPA: Crew Resource Management," *Combat Edge ACC's Full-spectrum Safety Magazine*, Spring Edition 2015) Photo courtesy of Staff Sgt. Adawin Kelsey.

In a recent internal Air Force memo, Air Combat Command reported being unable to meet the demand for further Predator and Reaper missions due to pilot shortages.[10] An indication of this manning crisis is in the Predator and Reaper crew ratio. The crew ratio is the number of pilots required to operate an RPA aircraft for twenty-four hours. For Predator and Reaper aircraft, the crew ratio goal is ten to one for each drone.[11] In emergency operations the ratio could be reduced to 8.5 to 1. Currently the Predator and Reaper crew ratio sits at 8 to 1 for each orbit.[12]

This paper will review the historical decisions that led to the current manning crisis and determine if enlisted pilots could serve as a talent pool; which could eliminate the manpower

shortage and set the stage for the USAF to meet increasing demands. It will examine how other branches of service address the training of enlisted pilots and review how other branches structure the enlisted and officer force for RPA operations.

The first Predator operation occurred in 1995 during Operations Deny Flight and Deliberate Force.[13] Originally, only rated pilots were allowed to become RPA pilots.[14] This decision was sustainable when 50 RPA pilots could support RPA operations. However, as RPA capabilities and demand increased, manning decisions were changed to meet the demand. In 2008, the Air Force changed this policy to allow non-rated officers to be eligible for RPA pilot duty.[15] There are currently over 1,300 RPA pilots with a projected need of 1,650 pilots.[16] A goal of 90% non-rated pilots was established but has never been met, in large part because the Air Force is unable to recruit enough non-rated pilots.[17]

Air Force leaders point towards the classified nature and lack of understanding of many RPA operations as a key reason that it is hard to recruit personnel to the career field.[18] Being unable to explain or demonstrate aspects of the mission can make recruiting difficult, but it should not be used as an excuse. There are other classified jobs such as Cryptologic Linguist (1n3), Nuclear Weapons (2w2), and Airborne Battle Management (1a4) throughout the Air Force that are not facing the same manpower shortage.[19] It also does not acknowledge the overall perception of the RPA community by the rest of the flying community. RPA operations are viewed as a dead end career move for many young officers who see the low promotion rate of RPA pilots as worrisome and being viewed as “second class citizens” by fellow fighter pilots.[20]

A recent report showed that RPA pilots are promoted at a 13% rate below their counterparts.[21] The perception of a dead-end career, reinforced by low promotion rates, can be pointed to as a reason that the RPA community has not been able to meet its recruitment goals. The service failed to meet its recruitment goal as recently as 2012 and 2013, missing it by 39% in 2013 (110 enlisted against a goal of 179).[22] In response to the recruitment shortfall the Air Force continues to assign rated pilots to RPA pilot positions. Currently, 545 RPA pilots are rated pilots, some of whom are extended beyond their one required RPA tour to meet mission requirements.[23] An additional 80 rated pilots graduating UPT this year will be temporarily assigned to RPA positions.[24] These 80 pilots represent another stop gap measure by Air Force leaders as they explore ways to fix the pilot shortage permanently.

In an attempt to address pilot staffing, Secretary of the Air Force, Deborah James, announced in December of 2015, that enlisted members would be allowed to pilot the RQ-4 Global Hawk.[25] RQ-4s represent a small portion of the Air Force's RPA inventory (33 out of 276 aircraft numbers gathered from each airframes Air Force fact sheet.) and according to a 2012 Congressional Rreport is projected to be an even smaller portion in the future (15 out of 381 RPAs).[26] Placing enlisted pilots in only 4 percent of its future RPA inventory will not have a significant impact upon the RPA workforce, nor will it address the issue of officers not wanting to become RPA pilots.

The Air Force should rapidly expand the role of enlisted pilots to include all Remote Pilot Aircraft (RPA) in the USAF inventory beyond its December 2015 announcement of allowing enlisted pilots to fly Global Hawk RPAs. Limiting enlisted pilots to Global Hawks provides relief to a small portion of RPA operations, but it does not address the issue of pilot shortages in

Predator and Reaper drones, which represent 89 percent of the current RPA inventory. Limiting enlisted pilots to the Global Hawks would leave a majority of the RPA weapons system manning at a level where pilots are overworked, burned out, and unsustainable. Since this is a new decision, some will suggest waiting and evaluating the success or failure of the Global Hawk program prior to making the change across all RPA weapons systems. The Air Force does not have time to take a measured approach as RPA manning is impacting current combat operations. Due to RPA pilot shortages and their impact on RPA operations, Defense Secretary Ash Carter approved the number of Combat Air Patrols supported by the Air Force from 65 to 60.[27] Each year 180 RPA pilots are being trained, but 240 pilots are leaving RPA operations.[28] Some critics point to an improved training program and increased graduation rates as an answer to the problem. Improving the training program will not fix the problem. The problem stems from producing officers who do not want to remain RPA pilots. A 2013 report showed that 1,117 of the 1,366 RPA pilots in the Air Force came from manned aircraft or the UPT program that were assigned as an RPA before being reassigned to a manned plane.[29]

The Air Force should join other branches of service and permit enlisted pilots to fly armed RPAs to ensure that it has enough pilots to close the manned aircraft pilot shortage. USAF General Herbert Carlisle testifying before Congress on March 17, 2016, reported the Air Force was short 511 fighter pilots and 200 RPA pilots for the current mission.[30] His testimony did not account for a plan to add 300 more RPA pilots to the force. Meaning the Air Force is short 511 fighter pilots and 500 RPA pilots for future end strength requirements. In contrast, Army General David Perkins reported that the Army was almost at 100 percent staffing for RPA pilots. He stated that one of the key factors for being able to achieve such a high manning rate was due to the "job satisfaction" of the RPA pilots in the Army.[31] The Army has kept the drone

operator connected to other normal Army operations, which could explain the higher level of job satisfaction.[32] Army and Marine RPA pilots are enlisted service members. This approach could be used as an example for the Air Force to follow. The Army, in particular, should be examined further as their enlisted pilots fly the Grey Eagle RPA, which is a newer version of the Air Force Predator. The Army has 61 Grey Eagles in operation with another 44 ordered [33]

Research Framework:

This paper will focus on the larger unmanned aircraft in the USAF inventory such as the Global Hawk, Reaper, and Predator to determine if using enlisted pilots for all RPA operations is a viable solution to the pilot shortage. Because the larger drones require multiple pilots to operate a single Combat Air Patrol (CAP), being able to improve the number of pilots for these larger drones will have the biggest impact on combat operations.

A problem/solution framework will be used for the research. An analysis of the RPA manning problem will include operational tempo, retention, pilot shortage, outside job opportunities, and the Air Force's historical responses to manning shortfalls. Alternatives that will be explored include training improvements by reducing the amount of training, which would increase the number of pilots trained. Another alternative would be to reduce the crew from two- to one-man crews through automation and system improvements. Finally, a history of enlisted members performing officers' duties will be used as an example of how well enlisted members have operated in that role previously.

BACKGROUND

The ability for the United States Air Force to meet future Remote Pilot Aircraft mission requirements is in question due to the current manning shortage. More RPA pilots are leaving the service or returning to their assigned manned aircraft than are being trained, and this pilot vacuum has an impact on mission capabilities throughout the Air Force. There are currently 1,300 qualified RPA pilots to meet a projected need of 1,650.[34] In 2014 the US Government Accountability Office (GAO) offered several recommendations to improve the manning of RPA systems in the Air Force. One of the recommendations included exploring other sources of RPA pilots to include civilian and enlisted pilots.[35] The Air Force partially concurred with this idea but overall rejected it as they still believed officers should pilot Air Force drones. The Department of Defense responded to the recommendation stating that from the beginning of RPA operations, and throughout its growth, the Air Force has examined the requirement and determined that additional manpower pools did not need to be explored as corrective actions were being taken to ensure crews were available to meet mission requirements.[36]

RPAs offer benefits of increased loiter time, reduced costs, and the ability to conduct multi-mission sorties while providing the most significant benefit of removing the human pilot from harm's way. All of these advantages have driven Combatant Commanders to request more RPA operations. The Department of Defense (DoD) has recognized the demand and increased overall inventory of unmanned aircraft from 167 in 2002 to 8332 in 2016.[37] The DoD aircraft procurement plan for fiscal years 2012 through 2041 seeks to increase the number of large RPAs from 340 in FY 2012 to 650 in FY 2021.[38] The RPA increase stands in stark contrast to the current RPA pilot shortfall.

Most Remote Piloted Aircraft sorties are flown in a Combat Air Patrol (CAP) mission parameter, where the aircraft will loiter over a geographical area providing Intelligence, Surveillance, and Reconnaissance (ISR) of the battle space. A 24/7 RPA CAP requires four RPA aircraft, multiple aircrews, and numerous support personnel.

As mission demands increased against the backdrop of pilot shortages, Air Force leaders implemented surge operations to meet the demand (Fig. 5). In 2007, Air Force leaders required the RPA community to increase operations to support a goal of 21 CAPs by 2009. In order to meet the CAP goal manned-aircraft pilots assigned to RPA units were extended and reserve RPA pilots were mobilized. In 2008, RPA operations were increased three separate times. In addition, manned-aircraft pilots were frozen in RPA units and the RPA weapons school was delayed. Unable to get ahead of the operations tempo, 2009 saw manned aircraft pilots assigned to RPA squadrons extended indefinitely and UPT graduates assigned to RPA units. In 2010 and 2011, once again surge operations allowed the Air Force to meet eleven additional CAP requests. By 2013, the RPA community was supporting 65 CAPs across the globe.[39]

The constant surge, has forced RPA professionals to work six days a week for up to fourteen hours a day. As a result, RPA pilots log flying hours above and beyond the average flying hours of pilots in manned aircraft.[40] On average, a RPA pilot flies 900 to 1,000 hours per year, shattering the 200 to 300 hours logged by manned aircraft pilots.[41]

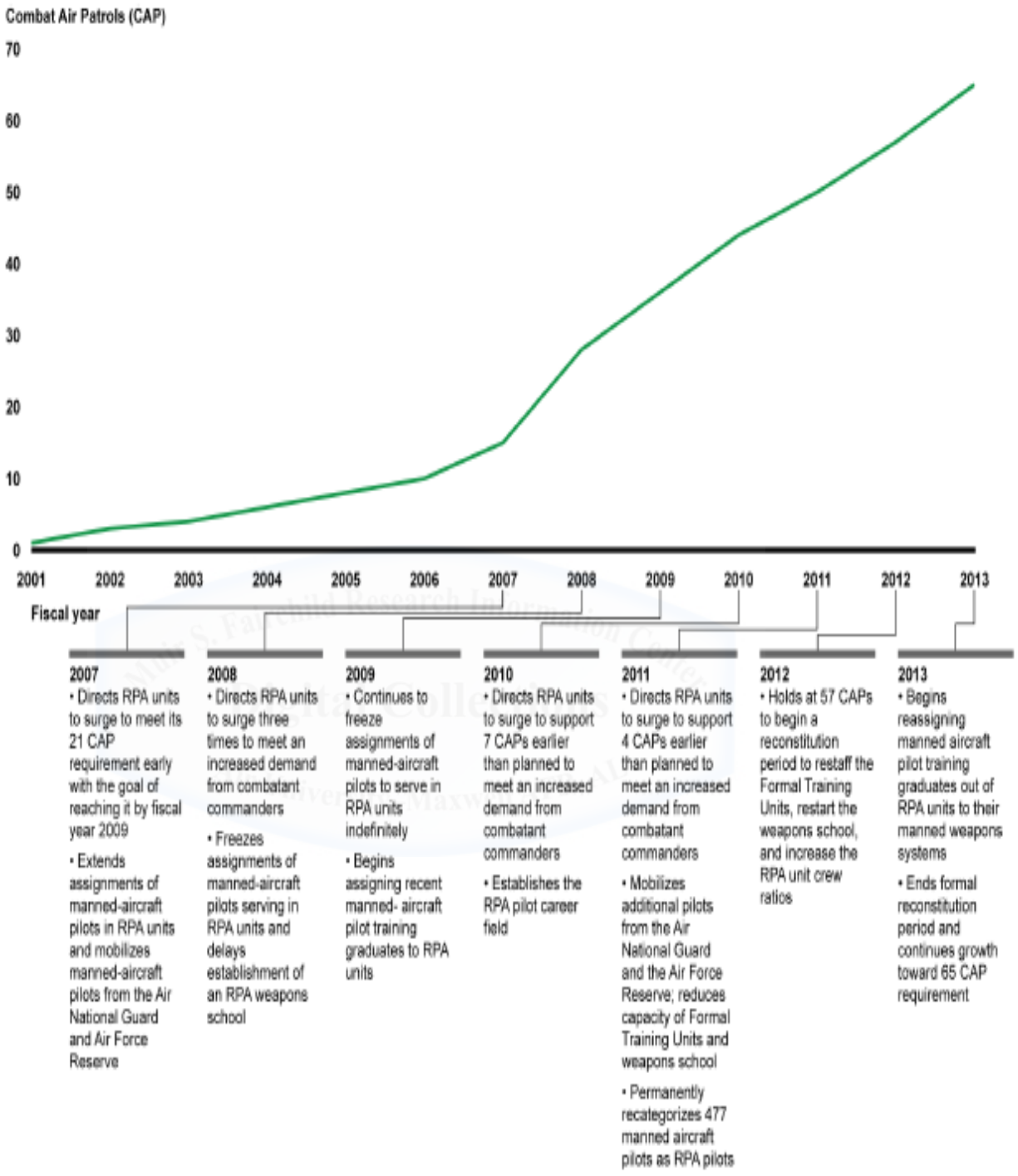

Fig. 5. Air Force Historical Response to Increased RPA CAPs through 2013.
(Reprinted from United States Government Accountability Office, *Actions Needed to Strengthen Management of Unmanned Aerial System Pilots (GAO-14-316),* April 2014, page 13)

High Operations Tempo

Due to the constant high operations tempo, cracks are starting to be seen within the RPA community. The 432nd Wing, for example, has flown over 3,300 sorties conducting 875 airstrikes against the Islamic State (ISIL).[42] The high sortie rate is a testament to the professionalism of the wing, but it has come with a price. In 2014, wing health care professionals at Creech AFB who are trained to deal with mental health issues of personnel operating in a classified arena, reported having thirteen suicide saves.[43] The report did not break down these attempts into specific career fields but it does allude to them being part of the RPA community at the Wing. Also 18X (RPA pilots) are being diagnosed with a new version of Post-Traumatic Stress Disorder (PTSD).[44]

RPA pilots are exposed to the ramifications of their strikes, whereas many manned aircraft pilots do not see their target or the immediate impact of the strike in such high resolution or are required to loiter over the area of a strike monitoring the outcome of the attack. This proximity to the carnage of war on a continual basis leads to RPA pilots being "deployed-on-station," where they have difficulty separating combat operations from picking their children up from soccer practice.[45] Transitioning in and out of combat operations while never leaving home adds to the stress.

Job Satisfaction

In addition to the stress of being overworked and deployed-on-station, there is the challenge of not being accepted by fellow pilots within the Air Force. Although RPA pilots are technically members of the flying community, they are often looked down upon by that same flying community and viewed as a "leper colony", a term former Chief of Staff, General

Schwartz, used in 2008 to acknowledge many people's views towards unmanned flight.[46] A 2014 report showed that "lower quality pilots are sent to RPA squadrons" from manned-aircraft units.[47] This perceived leper status of being banished to the island of RPA flight is reinforced by squadron commanders who send their under-performing manned-aircraft pilots to RPA operations.[48] It is said that actions speak louder than words and perception is often reality. Either way it is upon this foundation that RPA pilots find their careers built, and this is contributing to qualified pilots leaving the RPA workforce.

As experienced pilots leave the 18X community, the RPA pilot shortage impacts the ability to train. Subject Matter Experts (SME) have left both the squadron and the school house. This has affected the number of experienced instructors training newly selected RPA pilots; it has also affected the overall training of qualified RPA pilots. 65 percent of drone pilots are not completing required continuation training as outlined in the 2014 Ready Aircrew Program Tasking Memorandum due to a high operations tempo and a lack of manning.[49]

In December 2014, the commanding general of ACC announced, that "virtually no continuation training had been accomplished in the last seven years" due to the constant state of surge operations.[50] Airmen, unable to improve themselves in both their job and career, regardless of the validity of their mission will lose job satisfaction and seek employment elsewhere. This is a human requirement that can be seen as an issue in the RPA community. A person's basic needs as classified by psychologist Abraham Maslow are broken down into 5 levels; Physiological, Safety, Social, Esteem, and Self-Actualization.[51] These five basic needs are best viewed in a pyramid with Physiological at the bottom, followed by Safety and Social, then Esteem and finally Self-Actualization. Each level of the pyramid must be met before a person can move on to the next level. Esteem centers around self-worth and confidence that is grown through

achievement and respect by others, and to others. It is evident that many in the RPA community do not feel their basic needs are being met through the job otherwise; retention and recruitment would be higher. A recent article in a small business web site listed four major causes for job dissatisfaction: underpaid, limited career growth, lack of interest, and poor management.[52]

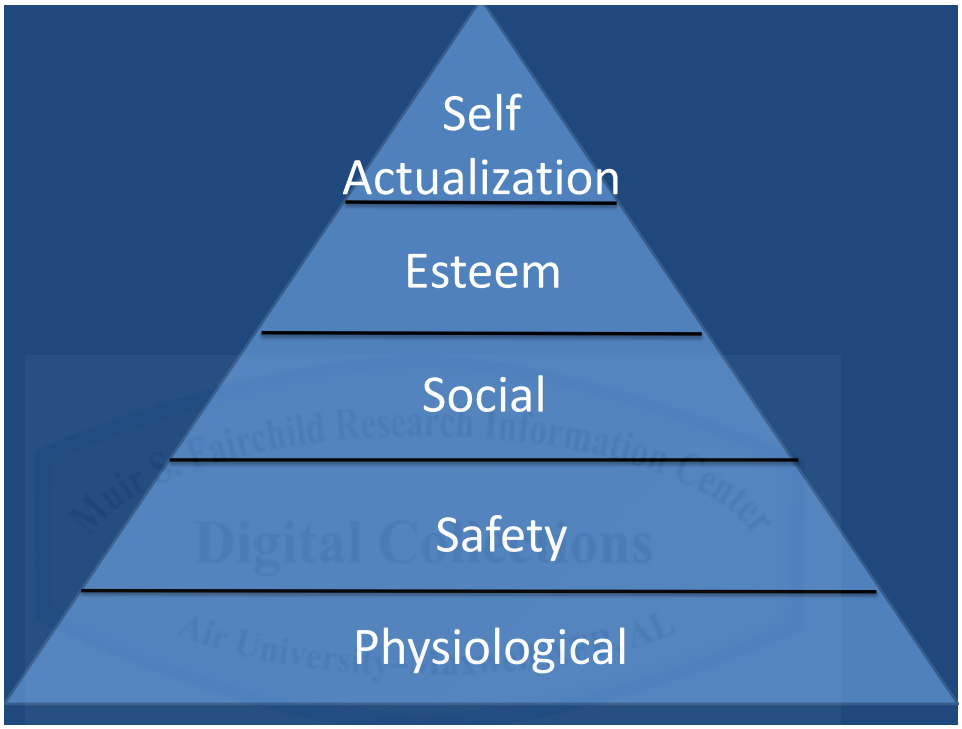

Fig. 6. Maslow's Hierarchy of Basic Human Needs.

Recruit and Retain

The Air Force has been offering increased incentive pay and signing bonuses for several years in an effort to increase compensation and improve attrition rates. In addition to the money, Air Force leaders created a dedicated career field for RPA pilots (18X), along with a review of promotion rates.[53] Prior to the 18X designation RPA pilots did not have a dedicated training pipeline nor did they have a career path within the RPA pilot position. Both of these actions point towards the service trying to resolve the concern for limited career growth. However,

looking at the long-range career growth for RPA pilots the chance for wing-command is almost non-existent in comparison to fighter pilots. There are 26 fighter wings and 1 RPA wing within the Air Force. Meaning that RPA pilots have a 1 in 26 chance of becoming a wing-commander in their career.[54]

When the Air Force does attempt to entice RPA pilots to stay with offers of signing bonuses it ends up being ineffective or mis-targeted. An example of this occurred in 2015, as the Air Force offered RPA pilots a $125,000 retention bonus that was similar to bonuses offered to other pilots.[55] Most RPA pilots did not qualify for the money due to a lack of experience. Only 10 RPA pilots qualified for the bonus in 2015.[56] The bonus was just another failed attempt to stop a negative growth rate in the career field. The manned aircraft pilots who were assigned to RPA duty did not qualify for the bonus, providing no incentive to remain RPA pilots instead of returning to their prior aircraft assignment. The RPA pilots who did qualify for the bonus were not always willing to take it to remain in the career field.

Ryan, an RPA pilot and former F-16 pilot, summed it up in the following comment, "What the Air Force doesn't get is that they can't throw money at us to make us happy. I didn't even know how much a pilot made when I enlisted. I just wanted to fly."[57] (It is AF policy that RPA pilots and operators are only identified with their first name due to security concerns) Recruiting and retention is the key to successfully staffing the RPA community now and going forward.

One option to have the bonus positively affect the RPA community would be to open it up to all RPA pilots, regardless of experience, while at the same time requiring any RPA pilot who took the bonus to forfeit that bonus if returning to a manned aircraft. Opening the bonus up

to all RPA pilots and restricting their movement back to manned-aircraft could provide enough of an impetus to stay in the RPA community. The challenge to this approach would be the negative impact it could have on piloted aircraft that are currently experiencing a pilot shortage as well. The pilot crisis in the Air Force goes beyond RPAs; in 2015, the Air Force reported being 520 fighter pilots short of the required strength.[58]

Civilian job opportunities for drone pilots offer a lucrative break from the stresses of service in the Air Force with salaries of $100,000 being offered for civilian RPA pilots both in government service and as contracted employees overseas and within the United States.[59] The Air Force should embrace it and use it as a recruiting tool for RPA pilots in the same way that regular pilots enter the service with an understanding that becoming a USAF pilot will open civilian job opportunities when their service commitment is fulfilled. Highlighting this connection between RPA pilot positions and regular pilots would open doors after their service commitment and could help in recruiting regardless of the classified nature of the job.

The air traffic career field offers comparative insights into a way to recruit and train shorter-term Airmen. Former 241 Air Traffic Control Squadron commander, General Craig McCord, noted that it was easier to recruit air traffic controllers than radar maintainers because air traffic controllers work in a position most people hold in high regard (even if they do not know what the job entails) that offers a good paying job. It also represents a career both in and out of uniform. He was quite prophetic, never in my 15 years did I see the controller side of squadron's manning fall below ninety percent. Connecting the military RPA pilot's job with a civilian career will help in recruiting but could add to the challenge of retaining qualified RPA pilots.

Enlisted Pilots

In 2008, the Air Force did away with the requirement that all RPA operators be rated pilots. At that time, when asked if enlisted pilots could be an answer to the pilot shortage, Brigadier General Lyn D. Sherlock, stated that enlisted careers in RPAs were unreasonable "Because battlefields are complex, joint environments that involve other aircraft and communicating with soldiers and airmen on the ground."[60] Later on, General Sherlock again reasoned that RPA pilots needed to be officers because, “We need them to bring their officer expertise to our headquarters and to work with our partners in the other services within the joint world.”[61]

Seven years later, on December 17, 2015, Air Force Secretary Deborah Lee announced that enlisted members would be able to fly RPA Global Hawks.[62] An answer to the concern raised by General Sherlock can be seen through the performance of Combat Controllers and enlisted Weapons Directors. The mission of a combat controller is to deploy, undetected, into combat, and hostile environments to establish assault zones or airfields while simultaneously conducting air traffic control, fire support, command and control, direct action, counter-terrorism, foreign internal defense, humanitarian assistance, and special reconnaissance in the joint arena.[63] They work in a complex airspace dealing with multiple inputs from aircraft aloft and troops on the ground engaged in combat including multinational operations to call in airstrikes in support of combat ground operations.

Similarly in the 1990s, the Air Force experienced a shortage of Weapons Director officers aboard AWACS aircraft (Airborne Warning Command and Control Systems Surveillance Technicians) and ground operations (Aerospace Control and Warning System

Technician).[64] As a result, it placed enlisted members into the role of Weapons Directors (WD) to serve as a C2 element monitoring offensive and defensive operations during combat operations to include directing aircraft towards hostile threats.[65] The paper did highlight a higher washout rate from enlisted WD as opposed to officers but there was no reported degradation of mission during the time of enlisted WD in both airborne and ground based units. As officer manpower improved, the WD position in AWACS was returned to an officer's duty. However, enlisted WD's are still in place in the Ground Tactical Air Control Squadrons (GTACS). In both jobs, the high level of performance in a complex arena points towards the ability of enlisted members to meet the concern raised by General Sherlock.

Initially, enlisted pilots will only fly RQ-4 Global Hawks, which conduct high-altitude ISR missions similar to the manned U-2.[66] By contrast, the MQ-1 Predator and MQ-9 Reaper can conduct ISR missions and targeted strike missions. Unlike its armed RPA brothers, the RQ-4 is almost autonomous. Capable of landing itself, it receives keyboard inputs over normal flight controls.[67]

Air Force leaders did not identify the fact that the RQ-4 is unarmed as being the reason for limiting enlisted pilots to that particular drone. Air Force Spokesman LtCol Christopher Karns, for example, acknowledged that there are no weapons on the RQ-4 but pointed out that enlisted members were not prohibited from using weapons.[68] Chief of Staff Gen. Mark Welsh explained that, "The enlisted experience of flying Global Hawks under the supervision of rated officers will inform us whether we apply a similar approach to other weapons systems," thus opening the door to a future expansion of enlisted pilots to armed RPAs.[69]

Limiting enlisted pilots to the Global Hawk could prove to be a timely mistake. Both the Army and Marines have enlisted pilots flying RPAs, to include versions of the Predator that are capable of conducting airstrike operations. The Air Force currently trains the enlisted Marine pilots, so it has already been proven to be a successful program and one that the Air Force supports for a sister service.[70] The time has come for the Air Force to join with other members of the Department of Defense and return to the historical past by allowing enlisted pilots to fly all RPAs. For this to take place, a cultural shift within the USAF and in particular within the senior leadership of the service will need to occur. Expanding RPA pilot positions to enlisted members has some historical precedent. During World War II, nearly 3,000 enlisted pilots completed pilot training. They achieved a high level of success producing 17 aces, eleven of whom later became generals.[71] The most notable enlisted pilot in Air Force history is General Chuck Yeager.[72]

SOLUTIONS

When faced with staffing issues, organizations usually have two options: one is to hire or train more people: the other is to use technological advancements and reprioritize work to allow fewer people to do more with less. The do more with less mantra has been a constant theme in the Air Force since the end of the Cold War.[73] The United States military is still feeling the effects of the latest budget cuts as politicians are continuously decreasing military manpower and resources. However, doing more with less is no longer an option for the RPA community as each and every day the demand for RPA operations increase.

Even as leader's push to increase the overall manpower by 60,000 personnel, the United States Air Force is projected to be at its smallest size by the year 2020.[74] While enlisting more people is a simplistic approach that provides the quickest answer, it is one that does not match

the current political climate and one that will not be explored in this paper. Working within the current Air Force work force levels provides a more practical means of targeted manpower increases that will produce the most significant results.

Improved Training

Air Force leaders have taken steps to increase the work force at RPA training programs across the force to help raise the overall number of RPA pilots produced each year. The number of instructors at the 558th Flight Training Squadron (FTS) will increase from 70 to 112. This will allow the organization to meet its goal of 384 graduates a year by the end of 2017.[75] On January 11, 2016, the squadron welcomed its first 24-student class, doubling the number of students in previous classes and putting the school on pace to graduate 294 RPA pilots in FY 2016.[76]

The 384 graduates will help alleiviate the manning crisis but will not answer it completely because 240 pilots are projected to leave the career field each year.[77] The 144 pilot gain per year by 2017 will not close the current 350 RPA pilot gap rapidly enough nor will it meet the projected growth for 200 more pilots. Curently the 1,300 RPA pilots are overworked and need an additional 350 pilots to meet current operation levels. It will take more than three years to meet this goal. The larger pilot threshold of 1,850 RPA pilots will not be met by simply increasing the number of trainers across the service. A review of the Air Force RPA and US Army Unmanned Aerial Vehicle training programs identifies areas to change and improve upon with the ability to produce more RPA pilots.

The Air Force's Undergraduate Remotely Piloted Aircraft Pilot Training (URT) program is broken down into three phases. RPA pilots first complete an Initial Flight Screening (IFS) program (all future pilots are put through this screening regardless of airframe assigned) that

determines if a candidate has what it takes to become a pilot over the course of 37 training days.[78] Then RPA pilots complete undergraduate school and simulator training program that takes place on Joint Base San Antonio-Randolph through the 558th Flight Training Squadron (FTS). URT is a six month program that produced 182 RPA pilots in 2014.[79] Following the undergraduate school, pilots are assigned to a specific airframe (Predator, Reaper, Global Hawk) and sent to a Formal Training Unit (FTU) for that RPA (picture 5), which lasts 6 months before the student becomes mission qualified. In total, RPA training from IFS through FTU takes a year.[80]

Fig. 7. MQ-9 Reaper training at New York ANG (FTU). (Reprinted from Hans M. Poole, "ANG's First MQ-9 Schoolhouse Graduates Students," *Hancock Field ANG Base*, 22 May 2012) Photo courtesy Tech. Sgt. Ricky Best

Fig. 8. Army RPA training at Ft. Huachuka. (Reprinted from Amy Sunseri, Natalie Lakosil, Joan Vasey, "15W UAS Operations Learn Ground, Flight Skills on FH,*"Army.mil*, 23 August 2012) Photo courtesy of Natalie Lakosil

In contrast the Army training for Gray Eagle operators is a 25 week course at Fort Huachuca, NM.[81] The primary difference in training is that the Army does not have an Initial Flight Screening program for RPA operators. The secondary difference is that the Army has been training classes of 20 students or more routinely since 2012.[82] The Air Force will now run larger classes than the Army but still produce a significantly lower number of RPA students. The Army trains 894 RPA students each year.[83] While the larger number can be explained by the fact that both small and large RPA pilots are counted in this number, the Army is still producing more pilots than the Air Force. In addition, the Army is also putting their RPA pilots through sensor operator training during the 25 week course.[84]

Eliminating the IFS portion of the training is an option that should be explored going forward, but it would require a cultural divergance away from airmanship. Airmanship is an important aspect to Air Force leadership; it is listed as one of the five catagories of military training at the Air Force Academy. The five catagories are Basic Cadet Training, Military Education, Professional Development, Airmanship, AF Officer Careers.[85] Does the airmanship

gained by IFS serve any purpose for RPA operations? Does the IFS portion lasting only several weeks really instill airmindedness or is it a practical way to save money by determining who will not do well in flight school due to physical or mental reasons? These are some of the questions that should be answered by another study. Intitially the URT course for RPA pilots had a limited amount of flying hours connected to it. But based upon recommendations from RPA instructors the flying hours in a manned-aircraft were expanded at the IFS phase of the program.[86] In order to see if this decision was correct the study should also explore the RPA safety incident rate between similar Air Force and Army RPAs. This would be a critical step in justifying the IFS requirement because both services are flying the Predator RPA and it affords the Department of Defense the ability to compare the Air Force IFS requirement against the Army and its non-IFS training.(Fig. 9)

Service	Term used for Unmanned Aerial System (UAS) pilots	Personnel assigned to be UAS pilots	Use of manned-aircraft pilots as UAS pilots	UAS pilot specialist career	Manned-aircraft training of personnel
Air Force	Remotely piloted aircraft pilot	Officers	Yes	Yes	• All personnel receive manned-aircraft flight training
Army	Unmanned aircraft system operator	Officers overseeing enlisted personnel[a]	No	Yes	• No personnel receive manned-aircraft flight training
Marine Corps	Unmanned aircraft commander	Officers overseeing enlisted personnel[b]	Yes	Yes	• All personnel receive manned-aircraft flight training
Navy	Air vehicle operator	Officers	Yes	No	• All personnel are manned-aircraft pilots and receive manned-aircraft flight training

Source: GAO analysis of DOD data | GAO-15-461

[a]The Army also assigns warrant officers who specialize as UAS Operations Technicians. These personnel develop UAS requirements, coordinate airspace requirements, and act as the Army liaisons for all UAS missions.

[b]The Marine Corps assigns enlisted personnel to operate the flight controls of a UAS and to operate UAS sensors as well as officers as part of the UAS aircrew to oversee the actions of the enlisted aircrew.

Fig. 9. Branches of Service RPA pilot sourcing and training requirements. (Reprinted from United States Government Accountability Office, *Actions Needed to Strengthen Management of Unmanned Aerial System Pilots (GAO-14-316)*, April 2014, page 18)

Removing the IFS for RPA pilots would shorten the overall training time by fifteen percent (full RPA training is 11 to 12 months) and would also provide more IFS slots to manned aircraft pilots. An in-depth study of overall RPA flight safety should be accomplished to determine if the IFS program raises the operation safety level of Air Force RPA pilots compared to Army RPA pilots.

Beyond increasing training output and streamlining training, the Air Force needs to conduct an in-depth study as to why RPA pilots have a washout rate three times higher than manned pilots in Undergraduate Pilot Training (UPT).[87] There was no clear evidence of why the failure rate is so different between the two undergraduate programs. One factor could be that an officer who fails out of manned UPT is allowed to enroll in RPA UPT where as failing out of RPA UPT eliminates the member from any pilot position.[88] This movement of a failed student into the RPA program is of note because of one the biggest challenges to RPA flight is the inability of the RPA pilot to attain a 360 degree of awareness. The RPA pilot is limited by the information providedthrough the RPA's sensor and camera views as opposed to a normal pilot who is able to look out the canopy or flightdeck. Some aviators compare trying to achieve situational awareness (where and how you are flying) in an RPA to that of looking at the world through a straw.[89] The restricted view makes taking off or landing more difficult and dependant upon both instruments and sensors over the ability to look out the canopy.

In a manned aircraft there are two levels of flying, Visual Flight Rules (VFR) and Instrument Flight Rules (IFR). Pilots who are flying VFR are responsible to look out the window of aircraft and fly in a "see and avoid" manner. IFR requires the pilot to be able to navigate the airfraft using little to no visibility and fly by instruments alone. Sending RPA pilots through a manned aircraft training with an ability to look ou the canopy to aid in flying could create a pilot

who can not fly safely with such a restricted view. An in depth study attempting to identify the causes of the higher washout rate is needed. If after a study it is revealed that IFS is still needed another aspect to test would be to qualify RPA pilots for LRE and MCE seperately in the same manner as a civilain pilot is first VFR certified then later comes back to train and become IFR certified. By doing this the Air Force could allow the newer pilots to fly the less critical phase of flight in regards to flight safety while gaining experience and allow the more experienced pilots to handle the launch and recovery phase of operations.

Reducing the Crew Size

In 2013 the Air Force trained more RPA pilots than fighter or bomber aircraft.[90] As discussed earlier, even more RPA pilots will be trained this year than any year in the entire history of RPA operations but leaders still speak of an RPA pilot gap or shortage.[91] Instead of hiring and training more RPA pilots the Air Force could reduce the overall cost of RPA operations by reducing the number of crew members required to conduct RPA flights. Currently Predator and Reaper drones require a two-man crew of a pilot and an enlisted sensor operator. Improving technology to allow an RPA to be flown by only one person is an overall 50 percent reduction but it does not eliminate the need for the pilot, and it is the pilot manning, not the sensor operator staffing causing the issue in the RPA community.

Another option to consider is as technology advances, Having pilots control multiple RPAs pilots at one time. Current RPA missions are not conducted in formation flight, so anything gained by a single pilot controlling multiple RPAs is not practicable in today's irregular warfare operations. Technology could also allow for an RPA to become an autonomous aircraft. Removing the pilot and leaving the sensor operator would help the Air Force answer several issues. It would remove the need for RPA pilots and allow those who have been assigned to RPA

operations to return to manned flight operations, which would help close the pilot shortage in manned airframes. RPA pilots not able to transition to manned flight positions would need to be evaluated and possibly combined or converted into other non-flying positions.

The challenge to this operation is twofold: one, that multiple RPA operations and full autonomous flight is in the future; and second, that autonomous flight adds more logistical questions. Does the sensor operator of the RPA need to be a commisioned officer as opposed to an enlisted member? Does having autonomous flight simply move the pilot out of the pilot seat and into the sensor operator position, being responsible for the decision of lethal force but not with the flying of the aircraft? The far reaching implications of such a decision will not be pursued in this paper.

Enlisted Pilots

When the United States Air Force announced that it would begin to use enlisted members as pilots for the largest aircraft (Global Hawk) in the RPA inventory, it signaled that the Air Force was willing to explore all options to resolve an ongoing problem of drone pilot shortages. However, it does not go far enough in allowing enlisted members to become the pilot force for all RPA operations. The Air Force has tried to take many steps towards answering the RPA pilot shortage and workload issue from within the officer ranks, and none of these solutions have been successful in answering the manning issue.

Enlisted pilots could reduce the overall cost of RPA operations. The average USAF enlisted Sensor Operator makes $67,000 a year.[92] An Air Force pilot's average salary is $98,500.[93]Air Force leaders state that they need 1,650 RPA pilots to meet current and future mission demands. Converting the 1,650 RPA pilots from officer to enlisted positions could equate to a yearly savings of $51,975,000 for the USAF. In addition to the reduced costs of using

enlisted pilots, it could also allow the Air Force to reduce the highest officer to enlisted ratio in the Department of Defense. A 2014 report showed that the DoD officer to enlisted ratio stood at 4.6 enlisted members to every officer. The report showed the Air Force with a ratio of 4.0 to 1, followed by the Army at 4.2, Navy at 4.6, and the Marines at 8.0.[94] The force structure of the Air Force lends to the higher officer ratio. However, in today's climate of sequestration it is incumbent upon the Air Force to be as frugal as possible and to accentuate the strengths of the service while at the same time reducing the glare of difference. Reducing the officer to enlisted ratio through enlisted RPA pilots could help accomplish this goal.

At the time of this paper, the USAF would not release any retention data about enlisted sensor operators due to the recent announcement of allowing enlisted pilots to fly Global Hawks. However, looking back at historical data of reenlistment bonuses for sensor operators, it appears that enlisted RPA sensor operators are being retained at a higher rate than those officers with which they fly. In 2008, when faced with an RPA shortage of operators, the Air Force offered a reenlistment bonus up to $90,000 for sensor operators starting in FY2009.[95] The 2009 Selective Reenlistment Bonus (SRB) for RPA operators (AFSC 1U0X1) was broken down in the following manner: Zone A and C were offered a SRB multiplier of a 6 while Zone B was offered a multiplier of a 7.[96] Zone A is for members between 17 months and six years of active service, while Zone B is for those who reenlist when they have between six and 10 years of active service. Zone C is for service members who have from 10 to 14 years of active service.[97] The SRB is calculated by multiplying the service member's base pay by the zone multiplier and then multiplying that by the numbers of years for the reenlistment. The 2009 base pay rates for an E-4 with more than 4 years of service was $2,127.60.[98] An E-4 reenlisting for six years would

qualify for an SRB of $89,359. This showed that the service had a concern for Sensor Operator manning in 2009.

Any operators who reenlisted for six years would see their enlistment end in 2015. As such, the Air Force could be on the verge of losing a significant number of operators. Yet a review of enlisted career fields who were offered a Selective Reenlistment Bonus (SRB) for 2015 shows that Sensor Operators (AFSC 1U0X1) is not eligible for a bonus.[99] The SRB program is intended to keep mid-level airman, who are in a critical or emerging job which is overworked and understaffed, from leaving the service. This shows that Air Force does not see a shortage of sensor operators in the same manner in which it sees the RPA pilot crisis. It points toward how the enlisted force is accepting of RPA mission, and could be the best option for future RPA enlisted pilots.

RECOMMENDATIONS

As with any complex issue, there can be multiple solutions that have far reaching implications. Air Force leaders have taken several steps to improve the RPA workforce and reduce the stress of RPA operations that are outside the scope of this paper. These actions include reducing the frequency of rotating shifts, reducing commute times for personnel, changing unit designations from reconnaissance squadrons to attack squadrons, and even hiring contractors to fly ISR RPA missions.[100] These changes are an attempt to improve work life balance and have not been in place long enough to determine any prolonged impact to the RPA community. The solutions to the RPA crisis are complex and range from enlisting and retaining more people, reducing the crew size, streamlining training or transferring all RPA pilot positions to enlisted ranks.

The best option for the Air Force is a commingled approach of improved training, targeted manpower increases, and to convert all RPA pilot positions from officer to enlisted positions.

Air Force leaders have already increased the number of instructors at the RPA training school house and have expanded the number of FTU locations by incorporating the guard and reserve. These actions, as shown earlier, are projected to produce 300 RPA pilots a year. However, in order to get enough officers to fill all available seats in RPA training, the Air Force has taken officers assigned to manned-aircraft who have completed UPT and placed them into an RPA pilot position for their first assignment in an effort to bolster the pilot shortage of RPA and still point towards a recruiting and retention issue.[101] Attempts to improve the situation by creating a RPA career field and training pipeline have not proven successful at meeting the demand for RPA pilots. A review of RPA staffing in 2013 shows that three years after the 18X career field was created and the first URT pilot was trained, only eighteen percent of all RPA pilots, 249 come from the URT program (Fig. 10)

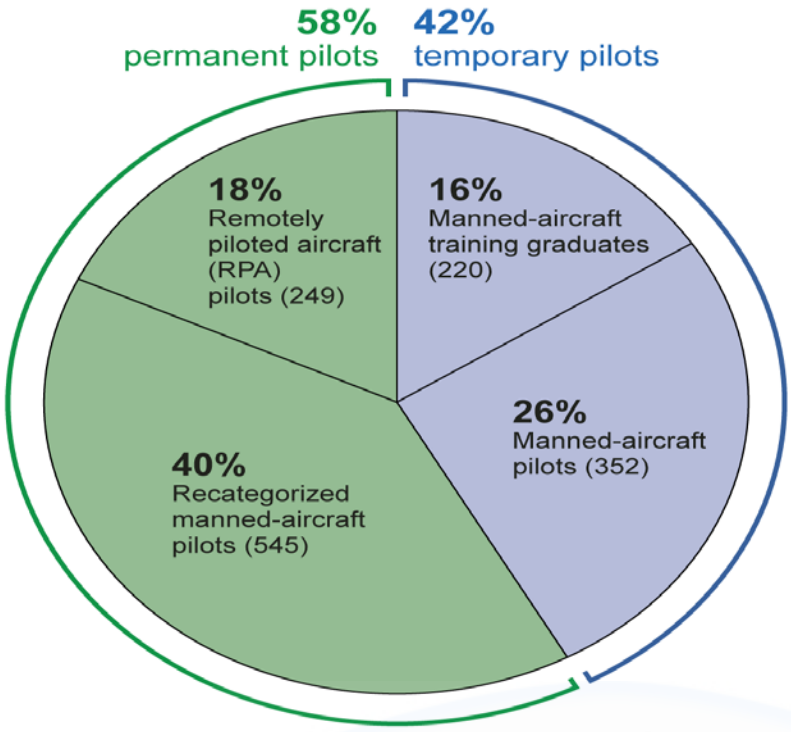

Figure 10: Source of RPA pilots in 2013. (Reprinted from United States Government Accountability Office, *Air Force Actions Needed to Strengthen Management of Unmanned Aerial System Pilots (GAO-14-316)*, April 2014, page 18)

Assigning pilots out of UPT is a costly labor solution. Each manned pilot costs $557,000 to put through UPT; in contrast URT has a $65,000 price tag per RPA pilot.[102] The Air Force has already announced that they will place eighty UPT graduates into RPA positions this year.[103] Costing the service $44,560,000 in delayed training. Training eighty enlisted members to fly an RPA would only require a $5,200,000 investment and save the Air Force over 39 million dollars in training costs alone.

Beyond the cost savings and bringing the Air Force in line with other services in regards to RPA operations, it would remove the stigma and competition between conventional pilots and RPA pilots for promotions. Commanders would not have to send qualified pilots to RPA duty as

a stopgap measure. These pilots will work for at least 3 years as RPA pilots before being allowed to return to their assigned aircraft. It is three years of delayed return on the training investment and 3 years less of a service commitment, as they begin to train on their original manned-aircraft system.

One of the challenges faced by the RPA pilot community is a promotion below their fellow officers. A 2014 report showed that RPA pilots were promoted below the average for active-duty officers on 20 of 24 promotions boards since 2006.[104] The stigma of being an RPA pilot when competing against other manned-aircraft pilots for promotion is being addressed by leaders of the Air Force.[105] Nevertheless, the high operations tempo and little down time is affecting the individual pilot and their career growth. Many RPA pilots do not have time to complete career enhancement opportunities, such as Squadron Officer School or a Master's degree making them less promotable.[106] The length of time to reduce the stigma and improve the manning can be too long for some pilots and could be contributing to the exodus from the RPA community. When speaking on the challenges of the new career field and its promotion rate, Air Force spokeswoman, Major Mary Danner-Jones said "that it could take 20 years for the career field to mature and stabilize including the promotion rates".[107] Twenty years to stabilize the RPA community would impact too many officers, especially with the Air Force officer retention policy. Governed by federal law, Defense Officer Personnel Management Act (DOPMA), Air Force policy requires that an officer passed over twice for promotion to major or above, unless offered continuation, is to be separated within nine months or offered early retirement.[108] This force shaping law places RPA pilots in greater jeopardy than fellow officers in the flying community and makes any fix action time sensitive.

The enlisted force also has a force management process based upon promotion called High Year Tenure. While it has the potential same affect of a passed over officer, an enlisted member is in control of their own career and testing ability through the rank of E-6. Therefore, a person who achieves the rank of E-6 can complete a 20-year career.[109] This is a significant benefit to converting to enlisted RPA pilots. An officer can be passed over twice prior to reaching the 20-year mark. Enlisted pilots would be promoted along with their peers based upon a set criterion of time in service, time in grade, evaluations, and decorations, balanced against the Weighted Airman Promotion System testing process. Also of note is the promotion of E-5 through E-6 requires no board review.[110] Removing the challenge of disadvantaged RPA officers competing for a promotion and career against manned-aircraft pilots and ensuring that qualified personnel would remain in the career field free from the threat of promotion board bias.

Converting to enlisted pilots would also allow the manned aircraft pilots to return to their planes and help to relieve the manned pilot shortage in the Air Force. It would also get a return on the investment of manned aircraft pilots. A recent report puts the cost of training an Air Force fighter pilot at six million dollars per year. The training and cost are lost by putting a fighter pilot into RPA pilot status.

The Air Force has turned to enlisted members when faced with officer shortages in the past. WWII saw enlisted pilots answer the nation's call. Then again, in the 1990s Weapons Directors positions were converted from officer to enlisted positions.[111] These conversions and subsequent performance of enlisted members set a high water mark for enlisted RPA pilots to strive to achieve. However, in both cases the Air Force used enlisted members as a quick fix and then returned the positions to officer status as staffing changed.

Returning any enlisted RPA pilot positions back to officer status would be a mistake unless all issues of second-class issues were resolved. It would also put the enlisted force on notice that they are no more than a stopgap in an officer world.

One of the challenges of converting the entire RPA force to enlisted positions is what to do with the officers who entered into RPA through the URT program and are not rated pilots. Because of this they cannot simply return to their previous airframe. A look at how the Army and Marines operate RPAs could be used as a possible example. In both branches of the service, an officer supervises the enlisted RPA pilot. This would allow the RPA officers the ability to broaden their officer ship by supervising enlisted members earlier than most manned-aircraft commanders while remaining within the RPA community.

The Air Force is trying to correct the RPA pilot staffing issue; it is a problem that must be solved as the service moves forward into the 21st Century. Some advocates of RPA capabilities point towards a future where manned flight will not be part of the air superiority puzzle. The Air Force was founded upon the pioneering ideas of Billy Mitchell and through that lens, leaders should explore the options of enlisted pilots. To do less could leave the Air Force unable to meet the challenges of this new century.

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